DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 08/28/2008 has been entered.

Specification

2. The amendment filed 08/28/2008 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: the gold wire in Fig. 3. Please remove the element 4 gold wire from Fig. 3, because the gold wire for connecting the submount and the TO-18 stem is not disclosed in the original disclosure.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. **Claims 1, 4-9, and 12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamimura et al. (JP 2002368271 A).

6. Regarding **claim 1**, Kamimura et al. teach a flip-chip-type gallium nitride compound semiconductor light-emitting device (flip-chip type III nitride compound light emitting device; Abstract) comprising a substrate (11; Drawing 1, paragraph [0019]), an n-type semiconductor layer (n-type layer 13; Drawing 1, paragraph [0019]), a light-emitting layer (the layer 14 containing the layer which emits light; Drawing 1, paragraph [0020]), and a p-type semiconductor layer (p type layer 15; Drawing 1, paragraph [0021]), wherein a negative electrode (n lateral electrode film 21; Drawing 1, paragraph [0023]) provided on said n-type semiconductor layer (13; see Drawing 1), and a positive electrode (p lateral electrode film 20; Drawing 1, paragraph [0023]) provided on said p-type semiconductor layer (15; see Drawing 1), the n-type semiconductor layer (13), the light-emitting layer (14), and the p-type semiconductor layer (15) being successively provided atop said substrate (11) in this order (see Drawing 1) and being composed of a gallium nitride compound semiconductor (paragraph [0019-0023]), wherein said positive electrode (20) has a three-layer structure (18p, 20a, and 20b) comprising an ohmic

electrode layer composed of rhodium (p electrode 18 which consists of Rh; Drawing 1, paragraph [0022]) which is in contact with said p-type semiconductor layer (15; see Drawing 1), an adhesion layer composed of titanium (a substrate layer 20a which consist of Ti; Drawing 1, paragraph [0023]) which is provided on said ohmic electrode layer (18p; see Drawing 1), and a bonding pad layer (the upper layer 20b; Drawing 1, paragraph [0023]) provided on said adhesion layer (20a; see Drawing 1) and being composed of a metal selected from the group consisting of gold, aluminum, nickel, and copper, or composed of an alloy containing at least one of these metals (Au, i.e. gold; paragraph [0023]); wherein the bonding pad layer (20b) is provided atop (on top of) a portion (e.g. the left half of 18p) less than the entirety of the ohmic electrode layer (18p; see Drawings 1), and that the adhesion layer (20a) has the same dimension (same width in Drawings 1) as the bonding pad (20b; see Drawing 1).

Kamimura et al. do not teach an adhesion layer has a thickness of 1000 Å to 3,000 Å as claimed, but teach an adhesive layer (20a) has a thickness of 10 Å to 1,000 Å (1 nm – 100 nm; paragraph [0010]), which overlaps the claimed range of 1000 Å to 3,000 Å, and this establishes a prima facie case of obviousness (see MPEP 2144.05).

7. Regarding **claims 4 and 5**, Kamimura et al. do not teach said ohmic electrode layer (18) has a thickness of, regarding to **claim 4**, 100 Å to 3,000 Å, and regarding to **claim 5**, 500 Å to 2,000 Å.

The parameters such as thickness of the ohmic electrode layer in the art of semiconductor manufacturing process are subject to routine experimentation and optimization to achieve the desired film quality during device fabrication. Therefore, it would have been obvious to one of

the ordinary skill in the art at the time the invention was made to incorporate the thickness of the ohmic electrode layer within the range as claimed in order to form a high quality film.

8. Regarding **claim 6**, Kamimura et al. also teach a flip-chip-type gallium nitride compound semiconductor light-emitting device according to claim 1, wherein said bonding pad layer (20b) has a thickness of at least 1,000 Å (1 micrometer, i.e. 10,000 Å; paragraph [0023]).

9. Regarding **claim 7**, Kamimura et al. teach said bonding pad layer (20b) has a thickness of 0.1 micrometers – 50 micrometers, i.e. 1,000 Å – 500,000 Å (paragraph [0010]), which overlaps the claimed range of 3,000 Å to 5,000 Å. This establishes a prima facie case of obviousness (see MPEP 2144.05 I).

10. Regarding **claim 8**, Kamimura et al. also teach a flip-chip-type gallium nitride compound semiconductor light-emitting device according to claim 1, wherein said bonding pad layer (20b) is composed of gold (paragraph [0023]).

11. Regarding **claim 9**, Kamimura et al. also teach a positive electrode (p lateral electrode film 20; Drawing 1, paragraph [0023]) for use in a gallium nitride compound semiconductor light-emitting device (flip-chip type III nitride compound light emitting device; Abstract), wherein said positive electrode (20) has a three-layer structure (18p, 20a, and 20b) comprising an ohmic electrode layer composed of rhodium (p electrode 18 which consists of Rh; Drawing 1, paragraph [0022]) which is brought into contact with a p-type semiconductor layer (p type layer 15; Drawing 1, paragraph [0021]) of said gallium nitride compound semiconductor light-emitting device (see Drawing 1), an adhesion layer composed of titanium (a substrate layer 20a which consist of Ti; Drawing 1, paragraph [0023]) which is provided on said ohmic electrode layer (18p; see Drawing 1), and a bonding pad layer (the upper layer 20b; Drawing 1, paragraph

[0023]) provided on said adhesion layer (20a; see Drawing 1), said bonding pad layer (20b) being composed of a metal selected from the group consisting of gold, aluminum, nickel, and copper, or composed of an alloy containing at least one of these metals (Au, i.e. gold; paragraph [0023]); wherein the bonding pad layer (20b) is provided atop (on top of) a portion (e.g. the left half of 18p) less than the entirety of the ohmic electrode layer (18p; see Drawings 1), and that the adhesion layer (20a) has the same dimension (same width in Drawings 1) as the bonding pad (20b; see Drawing 1)

Kamimura et al. do not teach an adhesion layer has a thickness of 1000 Å to 3,000 Å as claimed, but teach an adhesive layer (20a) has a thickness of 10 Å to 1,000 Å (1 nm – 100 nm; paragraph [0010]), which overlaps the claimed range of 1000 Å to 3,000 Å, and this establishes a prima facie case of obviousness (see MPEP 2144.05).

12. Regarding **claim 12**, Kamimura et al. also teach a light-emitting diode (a light emitting device 1; Drawing 2, paragraph [0023]) comprising a flip-chip-type gallium nitride compound semiconductor light-emitting device according to claim 1.

Response to Arguments

13. Applicant's amendments, filed 08/28/2008, do not overcome the objection to the drawings and the objection to the drawings still stands.

14. Applicant's arguments filed 08/28/2008 have been fully considered but they are not persuasive.

15. On page 7 of Applicant's Response, Applicant argues that independent claims 1 and 9 presently recite that the bonding pad layer is provided atop a portion less than the entirety of the

ohmic electrode layer, and that the adhesion layer has the same dimension as the bonding pad layer. In contrast, Kamimura discloses that preferably the whole front face of p lateral electrode is covered and p-lateral electrode film is formed thereon. Paragraph [0009]. Further, Kamimura discloses that it is desirable to make the configuration of n-lateral electrode film the same as that of the configuration of p-lateral electrode film. Paragraph [0015]. Figure 1 of Kamimura clearly shows that the whole front face of both the n-lateral electrode and the p-electrode are covered by electrode films, respectively. The amendment to claims 1 and 9 clearly distinguishes over the structure disclosed by Kamimura. Moreover, there is no apparent reason which would lead one of ordinary skill to form bonding pad layer (upper layer) 20b of Kamimura on anything less than the entirety of the underlying ohmic electrode layer.

16. The Examiner respectfully disagrees with Applicant's argument, because the amendment to claims 1 and 9 does not distinguish over the structure disclosed by Kamimura. Kamimura still teaches the bonding pad layer (20b) is provided atop (on top of) a portion (e.g. the left half of 18p) less than the entirety of the ohmic electrode layer (18p; see Drawings 1), and that the adhesion layer (20a) has the same dimension (same width in Drawings 1) as the bonding pad (20b; see Drawing 1) as disclosed in claims 1 and 9. The Examiner would like to emphasize that "atop" means "on top of" (The American Heritage® Dictionary of the English Language, Fourth Edition), which does not specify the sizes of the bonding pad layer and the ohmic electrode layer.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hsin-Yi (Steven) Hsieh whose telephone number is 571-270-3043. The examiner can normally be reached on Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne A. Gurley can be reached on 571-272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/H. H./
Examiner, Art Unit 2811
10/21/2008

/Shouxiang Hu/
Primary Examiner, Art Unit 2811